






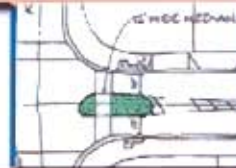









## **Appendix B**

# **PHYSICAL TRAFFIC MANAGEMENT DEVICES**

**(Commonly Referred to as Traffic Calming Devices)**

**Source: Walkable Communities, Inc.**

# Traffic Calming -- Intersection Tools

Traffic Calming -- Intersection Tools					
Tool Description	Added Benefits		Cost / Other	Plan View	
<b>Curb Extensions</b>	<b>Main Street</b>	<b>Neighborhood</b>			
Curb extensions are great tools for slowing speeds at intersections and midblock locations. They are often used in combination with other tools, such as refuge islands, or part of a modified intersection. They are very helpful to inset parking, meet ADA requirements and reduce pedestrian crossing times and distances.		Helps protect and preserve sight lines, eliminates illegal parking, helps assure emergency responder access to critical streets. Can be used for emergency responder operations area. Use to create chokers, chicanes, neckdowns.		Costs range from \$5-30,000 per corner. Costs are reduced if drainage is left open. This can increase maintenance costs, so these details must be worked out by a city/county team.	
<b>Refuge Islands</b>		Minimum preferred width 8.0 feet. Best when landscaping is used to help motorists see treatment in advance. Keep ADA ramps at grade or with light crown for drainage. Use full width ADA ramps, and create 45 degree bend, if midblock.		One of the most affordable tools. Does not affect drainage. Can be landscaped at added cost with or without irrigation. Used effectively in high pedestrian areas, such as schools, parks, stores.	
<b>Modified Intersections</b>		Vastly improves sight distances. Helps many motorists get into difficult or unsafe intersections. Can serve as a small neighborhood park or gathering place, thus increasing association and security of the neighborhood.		Very popular as a gateway to a neighborhood, or any place where excessive asphalt exists. Very high return on investment, especially where pedestrian crossings are risky. Avoid ugly temporary treatments.	
<b>Raised Intersections</b>		Can be used with very tight and narrow intersections. Used where roundabouts cannot fit. Highly attractive. Requires good coordination with engineering, landscaping and architectural specialists.		Very popular as a gateway to a neighborhood, or any place where excessive asphalt exists. Very high return on investment, especially where pedestrian crossings are risky.	
<b>Roundabouts, Mini-Roundabouts</b>		Roundabouts are excellent for entrances, intersections near schools, parks, gateways to downtowns, and many other locations. Always consider any time a signalized intersection is being funded.		Great range in costs. Mini-roundabouts can be \$10-50,000, while roundabouts can be \$50-500,000 for many sizes. Greatest safety benefit of all traffic calming tools.	

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# Traffic Calming -- Mid Block Tools

## Tool Description

### Speed Tables (Flat Top Tables)

Speed Tables slow traffic through vertical deflection. They are a best tool for pedestrian and bicyclist crossings. Although they are not desired where volumes are high (above 10,000), on bus routes or prime emergency response routes, they have great utility. Their most common placements are at schools, parks, many local streets, and on some moderate volume roads.



### Major Street

Speed tables are highly effective on narrow streets where parking must be maximized, and where other tools take away valuable land or parking. They can be colorized, enhanced with advance markings and made of asphalt or concrete.



### Cost / Other

Costs range from \$4-15,000. Costs are reduced if drainage is left open. This can increase maintenance costs, so these details must be worked out by a city/county team. They can be stamped or patterned for added attractiveness.

### Plan View



### Chokers

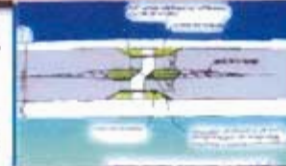
Chokers reduce speeding by narrowing passageways at appropriate points. They are highly effective when set at 10' width. Sometimes additional visual narrowing is applied. Chokers demand landscaping, so that they can be seen from a distance. Low, slow growth ground cover and tall trees are useful.



Chokers take up only moderate space, keeping parking toward a maximum. Chokers require low ground cover and tall trees for maximum safety and benefit. They are very attractive enhancements to neighborhoods, and quite popular.



Costs range from \$4-15,000. Costs are reduced if drainage is left open. This can increase maintenance costs, so these details must be worked out by a city/county team. They can be stamped or patterned for added attractiveness.



### Chicanes

Chicanes divert traffic from its intended course. Deflection speeds are held to 15-20 mph. These tools are highly effective and can be made very attractive. These tools work for all size vehicles. On low volume streets no treatments are needed for bicycles, but on higher volume Avenues it may be appropriate to channel bikes along their own independent course.



Chicanes take up longer sections of roads than most tools and must be carefully set between driveways. Meanwhile, they are very popular since they can create attractive mini-parks. Landscaping greatly enhances their performance.



Costs range from \$12-35,000. Costs are reduced if drainage is left open. This can increase maintenance costs, so these details must be worked out by a city/county team. They can be stamped or patterned for added attractiveness.



### Medians

Raised medians are especially useful around curves and on any overly wide street. Medians are the most attractive and least intrusive treatment. Their benefit to pedestrians is noteworthy. Medians can have openings for driveways, and so fit in many tight locations. Use care to keep medians in plain view, especially around curves and on hills.



Medians may restrict parking, especially on narrower roads. Medians can add significant beauty to neighborhoods. A variety of materials can be used. Concrete curbs are essential to their success.



Costs range from \$4-15,000. Costs are low, since they do not impact drainage. Using xeriscaping or other alternative landscaping materials can keep maintenance costs low. Light crowning aids detection and beauty.



### Short Medians

Short medians are best described as a pregnant median, or a mis-located roundabout. They are highly effective tools, slowing traffic to about 15-20 mph. Short medians are very attractive. However, they remove parking, and often appear to take land away from adjacent properties. Best for local streets.



Short medians can be neighborhood focal points or mini-parks. When parking, driveway placement and other land issues are not an issue they are exceptionally well liked by the entire neighborhood. Tall trees should be planted.



Costs range from \$10-25,000. They are often free if added as part of normal street construction. They rarely have impact on drainage. Often short medians are used to preserve a historic tree, cactus, boulder or other feature.



## **Appendix C**

### **COMMON MYTHS OF TRAFFIC CONTROL**

## Common Questions of Traffic Control

### Why can't we have a 4-way stop to reduce accidents?



Many people believe that installing STOP signs on all approaches to an intersection will result in fewer accidents, however, this is not always the case. Although the accident severity may be lessened, drivers are penalized by the additional delay and higher vehicle operating costs (fuel, brakes, etc.). There is no real evidence to indicate that STOP signs decrease the speed of traffic.

Impatient drivers view the additional delay caused by unwarranted STOP signs and begin to disregard their importance. Unwarranted STOP signs breed disrespect by motorists who tend to ignore them or slow down without stopping. This can sometimes lead to tragic consequences.

The Manual on Uniform Traffic Control Devices (MUTCD) published by the U.S. Department of Transportation is the national standard for Traffic Control Devices. The Virginia Department of Transportation has adopted the MUTCD as the State standard. The installation of a multi-way stop condition must first meet the warrants as set forth in the MUTCD. Any of the following conditions may warrant a STOP sign installation (sec. 2B-4):

1. Where traffic signals are warranted and urgently needed, the multi-way STOP is an interim measure that can be installed quickly to control traffic while arrangements are being made for the signal installation.
2. An accident problem, as indicated by five or more reported accidents of a type susceptible to correction by a multi-way STOP installation in a 12-month period. Such accidents include right and left-turn collisions as well as right-angle collisions.
3. Minimum traffic volumes:
  - (a) The total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour for any 8 hours of an average day, and
  - (b) The combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same 8 hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour, but
  - (c) When the 85th percentile approach speed of the major street traffic exceeds 40 miles per hour, the minimum vehicular volume warrant is 70 percent of the above requirements.

STOP signs should not be viewed as a cure-all for solving all safety problems but, when properly located, can be useful traffic control devices to enhance safety for all roadway users. Stop signs will not be used solely for speed control within the City of Lynchburg.

### **"Won't a 'children at play' sign help protect our kids?"**



At first consideration, it might seem that this sign would provide protection for youngsters playing in a neighborhood. It doesn't.

Studies made in cities where such signs were widely posted in residential areas show no evidence of having reduced pedestrian accidents, vehicle speed or legal liability. In fact, many types of signs which were installed to warn of normal conditions in residential areas failed to achieve the desired safety benefits. Further, if signs encourage parents with children to believe they have an added degree of protection - which the signs do not and cannot provide - a great disservice results.

Obviously, children should not be encouraged to play in the roadway. The "children at play" sign is a direct and open suggestion that it is acceptable to do so.

Federal standards discourage the use of "children at play" signs.

Specific warnings for schools, playgrounds, parks and other recreational facilities are available for use where clearly justified.

### **"Why not lower the speed limit to reduce hazards in our area?"**



An unrealistically low speed limit can actually lead to accidents. Here's why:

First, many studies conducted over several decades in all parts of the country have shown that a driver's speed is influenced more by the appearance of the roadway and the prevailing traffic conditions than it is by the posted speed limit.

Second, some drivers will obey the lower posted speed while others will feel it's unreasonable and simply ignore it. This disrupts the uniform traffic flow and increases accident potential between the faster and the slower drivers.

Third, when traffic is traveling at different speeds as mentioned above, the number of breaks in traffic to permit safe crossing is reduced. Pedestrians also have greater difficulty in judging the speed of approaching vehicles.

Finally, setting the speed limit to an unrealistic threshold as compared to the geometrics and appearance of the roadway will create a significant enforcement problem with the Police Department.

## **Appendix D**

### **COMPARISON OF TRAFFIC CALMING POLICIES FROM DIFFERENT AGENCIES**

# TRAFFIC CALMING COMPARISONS

ELIGIBLE STREETS					APPROVING CRITERIA					PHYSICAL MEASURES ALLOWED <sup>1</sup>												
AGENCY	STATE	WRITTEN POLICY	ACTIVE PROGRAM	COMMENTS	AVERAGE SPEED/CUT-THRU %	% CITIZEN APPROVAL	FUNDING PER YEAR	PRIORITIZATION PROCEDURE	COMMUNITY AWARENESS PROGRAM	SPEED WATCH PROGRAM/ ENFORCEMENT CONSIDERATION	PAVEMENT MARKINGS	SPEED HUMP	SPEED TABLE	CHUKER	TRAFFIC CIRCLE	MEDIAN ISLANDS	CHICANE	CLOSURES	SPEED ZONES	FOLLOW-UP EVALUATION		
1	VA Dept of Transportation	VA	Y	Y	Local - 25 MPH Collector - 25 MPH 2-Lane Not primary 12 dwellings per 1,000 ft	30 MPH	75%	Varies	Y - Point System	Mentions as first stop	mentions enforcement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2	City of Harrisonburg	VA	Y	Y	Same as VDOTs with small variation	2-31 MPH (66%)	70%	Varies	Y - Point System	Y - Written program	Y - Written program		Y	Y	Y	Y				Y - specific guidelines	Y	
3	City of Bedford	VA	N	N	Comprehensive plans mention design modifications to calm traffic					N/A	N/A									N/A		
4	Chesterfield County	VA	N - Have draft policy	N	VDOT	2-30 MPH	75%	\$50,000 if active	Y - own method	N/A	N/A	Y	Y	Y	Y	Y	Y	Y		N/A	N/A	
5	City of Hampton	VA	N	Y - (past 7 years)	N/A	> 8 MPH over posted (85%) 40% cut-thru during peak	2/3	Varies	N/A	N/A	N/A			Y		Y			Y	N/A	N/A	
6	City of Chocomaoka	VA	Y (recent)	Y	VDOT	2-32 MPH	75%	Varies	VDOT	Y	Mention enforcement		Y	Y	Y	Y	Y	Y		Y		
7	City of Alexandria	VA	Y	Y - includes dedicated program manager	Classification Designation by City - Specific volumes	15% of motorists going 5 MPH over speed limit	65%	\$477,000 - \$600,000	Y - own method	N/A	N/A		Speed cushions	N/A		Y		Y				
8	Town of Blacksburg	VA	Y	Y	N/A	N/A	N/A	Cost share program	First come-First serve	N/A	N/A	Y	Y		Y	Y	Y	Y			N/A	
9	City of Charlottesville	VA	Y	Y	All roadways up to minor arterial	use speed charts	60% response rate 2/3 agree	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	
10	City of Sarasota	FL	Y	Y	Neighborhood Streets	10 MPH over posted speed limit (26%)	Letter from Associations	\$300,000	Y - point system	N/A	N/A		Y	Y	Y	Y	Y	Y				
11	City of Winston-Salem	NC	Y - draft	Cape by Case	Neighborhood Streets	N/A	2/3 - non-responsive are "no"	N/A in CIP	Y - point system	Y	Y	Y	Y	Y	Y	Y	Y	Y			N/A	
12	City of Fayetteville	AK	Y	Y	Interals and collectors 2-30 MPH posted speed	Ranking system	75%	N/A in CIP	Y - point system	N/A	N/A	Vote on preferred strategy with citizen 60% or more must sign to remove										N/A
13	City of Portland	OR	Y	Y - some elements on hold	< 4000 AAU1 - locals and some collectors	Point System	30% return - 51% approval		Y - point system	Y	Y	Y	Y		Y	Y	Y				Y	

<sup>1</sup> VDOT provides design guidance for each